

What is claimed is:

1. A video output display apparatus for dynamically adjusting video frame to control playback quality, comprising:

5 a playback engine, sending a pre-fetch requirement, a playback requirement, and target frame data;

 a pre-fetch engine, coupled to the playback engine and comprising a pre-fetch buffer,
10 the pre-fetch engine obtaining pre-fetch frame data from the pre-fetch buffer according to the playback requirement and sending it to the playback engine, if the pre-fetch frame data according to the
15 playback requirement is not stored in the pre-fetch buffer, the pre-fetch engine obtains first playback frame data and sends it to the playback engine, the pre-fetch engine further receiving the pre-fetch
20 requirement, obtaining second playback data, storing it to the pre-fetch buffer, and adjusting the drop rate of the first and second playback frame data according to related conditions;

25 a rendering engine, coupled to the pre-fetch engine, obtaining source frame data , transferring the source frame data into the first and second playback frame data by decoding and filtering, and sending it to

the pre-fetch engine, wherein the decoding is half-frame and the filtering is frame-based; and

5 a drawing engine, coupled to the playback engine, receiving the playback requirement and the target frame data from the playback engine and outputting the target frame data.

2. The apparatus as claimed in claim 1, wherein the related conditions comprise video frame processing
10 time, real-time display definition time, and the pre-fetch buffer size.

3. The apparatus as claimed in claim 1, wherein the pre-fetch engine and the drawing engine are executed in multi-thread.

15 4. The apparatus as claimed in claim 1, wherein the drawing engine comprises a plug-in output module, attached to the drawing engine for outputting frame data.

5. The apparatus as claimed in claim 1, wherein
20 the playback engine sends the pre-fetch requirement during idle time.

6. The apparatus as claimed in claim 1, wherein the target frame data comprises video and audio data.

7. A method of displaying video output with
25 dynamically adjustable frame rate to control playback quality, comprising the steps of:

- 5 (a) providing a playback engine, a pre-fetch engine, a rendering engine, and a drawing engine, wherein the pre-fetch engine comprises a pre-fetch buffer and the drawing engine comprises a plug-in output module;
- (b) the playback engine sending a playback requirement and a pre-fetch requirement;
- 10 (c) the pre-fetch engine recognizing the playback requirement, obtaining pre-fetch frame data from the pre-fetch buffer, and sending it to the playback engine;
- (d) the pre-fetch engine sending the playback frame requirement to the rendering engine if the pre-fetch frame data is not stored in
15 the pre-fetch buffer;
- (e) the rendering engine obtaining first source frame data according to the playback requirement, transferring the first source frame data into first playback frame data by
20 decoding and filtering, and sending it to the pre-fetch engine;
- (f) the pre-fetch engine sending the received first playback frame data to the playback engine and adjusting the frame drop rate
25 according to related conditions of the first playback frame data;
- (g) the playback engine transferring the first playback frame data into target frame data and sending it to the drawing engine;

- (h) the drawing engine initiating the plug-in output module to output the target frame data;
- 5 (i) in step (c), the pre-fetch engine recognizing the received pre-fetch requirement, and sends the pre-fetch requirement to the rendering engine;
- 10 (j) the rendering engine obtaining second source frame data according to the pre-fetch requirement, transferring the second source frame data into second playback frame data by decoding and filtering, and sending it to the pre-fetch engine; and
- 15 (k) the pre-fetch engine storing the second playback frame data into the pre-fetch buffer and adjusting frame drop rate according to related conditions of the second playback frame data.

8. The method as claimed in claim 7, wherein in
20 steps (f) and (k), the related conditions comprise processing time of video frames, definition time of real-time display, and pre-fetch buffer size.

9. The method as claimed in claim 7, wherein
the pre-fetch engine and the drawing engine are
25 capable of multi-thread execution.

10. The method as claimed in claim 7, wherein in
the (a) step, the drawing engine comprises a plug-in

output module, attached to the drawing engine for
outputting data frames.

11. The method as claimed in claim 7, wherein in
the steps (e) and (j), the decoding is half-framed and
5 the filtering is frame-based.

12. The method as claimed in claim 7, wherein in
step (b), the playback engine sends the pre-fetch
requirement during idle time.

13. The method as claimed in claim 7, wherein in
10 step (g), the target frame data comprises video and
audio data.